Abstracts

Three-dimensional masterslice MMIC on Si substrate (Dec. 1997, Part II [T-MTT])

I. Toyoda, K. Nishikawa, T. Tokumitsu, K. Kamogawa, C. Yamaguchi, M. Hirano and M. Aikawa. "Three-dimensional masterslice MMIC on Si substrate (Dec. 1997, Part II [T-MTT])." 1997 Transactions on Microwave Theory and Techniques 45.12 (Dec. 1997, Part II [T-MTT] (1997 Symposium Issue)): 2524-2530.

This paper describes Si-based three-dimensional (3-D) monolithic microwave integrated circuit (MMIC) technology. This technology greatly improves the operating frequency of Si MMIC's up to the Ku band and makes them competitive with GaAs MMIC's in the higher frequency band. The characteristics of the coplanar waveguide formed on a lossy Si substrate and the TFMS line which is a basic element of the 3-D MMIC are numerically compared and discussed. An X-band amplifier, mixer, and highly integrated single-chip receiver using Si bipolar transistors are demonstrated to highlight the advantages of the Si 3-D MMIC technology. The cost reduction effect of the technology is also discussed. In our estimation, cost reduction of about 95% from conventional GaAs 2-D MMIC's can be achieved.

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